Wait Until Soil Temps Drop Before Applying Anhydrous Ammonia

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Abstract
With the early harvest, Iowa's conservation leaders are encouraging farmers to wait until soil temperatures lower before applying anhydrous ammonia (NH3) this fall. Anhydrous ammonia applied before daily soil temperatures remain below 50 degrees Fahrenheit and continue trending lower can result in the nitrogen loss that can impact crop development and have negative environmental impacts, such as enhanced leaching into groundwater and streams once converted to nitrate.

Keywords
Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Soil Science

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Wait Until Soil Temps Drop Before Applying Anhydrous Ammonia

By John Sawyer, Department of Agronomy; Barb Stewart, USDA-NRCS; and Bill Ehm, Iowa Dept. of Natural Resources

With the early harvest, Iowa’s conservation leaders are encouraging farmers to wait until soil temperatures lower before applying anhydrous ammonia (NH3) this fall. Anhydrous ammonia applied before daily soil temperatures remain below 50 degrees Fahrenheit and continue trending lower can result in the nitrogen loss that can impact crop development and have negative environmental impacts, such as enhanced leaching into groundwater and streams once converted to nitrate.

By waiting for cold soil temperatures, the applied ammonia will have a better chance to be retained in the soil and benefit the crop next spring. Cooler soil temperatures slow biological activity, which slows conversion of ammonium to nitrate, therefore allowing nitrogen to stay in the ammonium (NH4) form longer.

Heavy rains throughout 2010 caused a lot of yellow corn due to nitrogen loss. Stewart says applying anhydrous ammonia prior to soils dropping below 50 degrees could produce similar results. With high anhydrous prices this fall, consider a spring or split spring/sidedress application to make the best use of the nutrients.

Historically, soil temperatures at a 4-inch depth cool below 50 degrees in the northern third of the state during the first week of November. In central and南部 Iowa, soil temperatures cool below 50 degrees during the second week and third weeks of November. Producers and fertilizer dealers are encouraged to visit the Nitrogen and Phosphorus Knowledge web page to view daily, previous day, and 3-day history of average soil temperatures in every Iowa county.

ISU Extension research indicates lower yields can result when anhydrous ammonia is applied in the fall versus spring, and crop residue cover can be reduced by the tillage action of NH3 application, increasing the risk of soil erosion.

To save energy and money, NRCS recommends farmers use online energy estimators for tillage and nitrogen. The energy estimator for tillage estimates diesel fuel use and costs in the production of key crops. It compares potential energy savings between conventional tillage and alternative tillage systems. The energy estimator for nitrogen enables farmers to calculate the cost of nitrogen product use. It also evaluates options based on user input.

According to the USDA, nitrogen fertilizer is one of the largest indirect uses of energy in an agricultural operation. Fertilizer accounts for 29 percent of agriculture’s energy use, according to USDA research data. The energy consumption for nitrogen fertilizer manufacture and relation to application rate is outlined in an ISU Extension publication, Energy Consumption in Corn Nitrogen Fertilizer. Proper management of nitrogen fertilizer, including the use of organic sources of nitrogen, such as animal manure and cover crops,
can save producers energy and money.